Project 3 . Configure and Troubleshoot OSPF and EIGRP

Introduction

Project Overview:

This project aims to configure and troubleshoot two key routing protocols: Open Shortest Path First (OSPF) and Enhanced Interior Gateway Routing Protocol (EIGRP).

Objectives:

Configuration:

Set up OSPF and EIGRP on a network simulation platform, ensuring proper routing between multiple routers.

Troubleshooting:

Identify and resolve common issues related to routing protocols, including misconfigurations, adjacency problems, and route propagation.

Comparison:

Analyze the differences in performance and behavior between OSPF and EIGRP in various network scenarios.

Benefits of the project:

Hands-On Experience: Provides practical skills in configuring OSPF and EIGRP, enhancing understanding of routing protocols.

Troubleshooting Skills: Develops diagnostic skills through real-world troubleshooting scenarios, preparing participants for network issues.

Network Design Understanding: Improves knowledge of network design principles and how routing protocols interact within various topologies.

Documentation Skills: Enhances the ability to create clear and concise documentation, which is crucial for network management and future troubleshooting.

Presentation Skills: Builds confidence in presenting technical information clearly, an important skill for professional development.

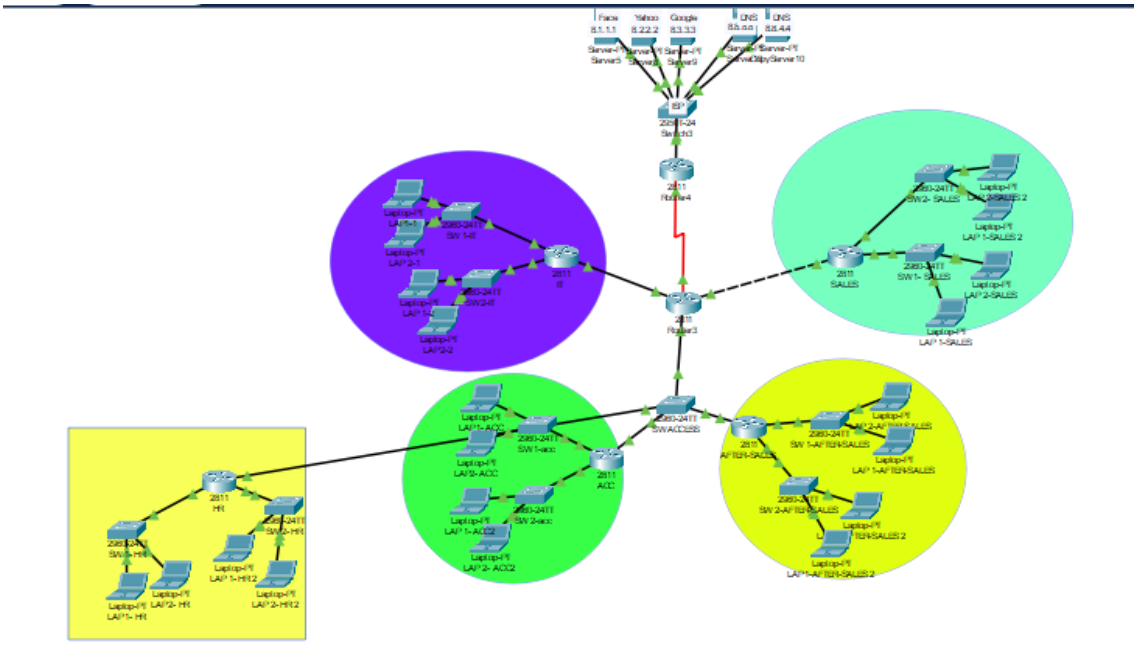
Collaboration: Encourages teamwork and collaboration if conducted in groups, fostering communication and project management abilities.

Career Readiness: Equips participants with valuable skills and knowledge that are highly sought after in the IT and networking job market.

Verification of Learning: Provides a structured approach to learning, ensuring that theoretical knowledge is applied practically and verified through tests and reports.

Network Design:

- Topology diagram



configuration

Eigrp

. Sales and it routers have been replaced from ospf to eigrp

Router it Config

=========

en

sh ip int brief ##

sh ip route ##

Conf t

no router ospf 100

Router eigrp 100

network 192.168.101.0 0.0.0.255

network 192.168.102.0 0.0.0.255

network 192.168.120.0 0.0.0.255

sh ip protocols##

sh ip eigrp##

Router sales Config

=========

en

sh ip int brief ##

sh ip route ##

Conf t

no router ospf 100

Router eigrp 100

network 192.168.103.0 0.0.0.255

network 192.168.104.0 0.0.0.255

network 192.168.121.0 0.0.0.255

sh ip protocols ##

sh ip eigrp ##

Cairo Config

=========

en

sh ip int brief ##

sh ip route ##

Conf t

router ospf 100

no network 192.168.120.0 0.0.0.255 area 0

no network 192.168.121.0 0.0.0.255 area 0

Router eigrp 100

network 192.168.120.0 0.0.0.255

network 192.168.121.0 0.0.0.255

ex

sh ip protocols ##

Ospf

For example R1

Config R2,R3,R4,R5 are the same

```
R1 Config
en
 conf t
  Hostname IT
   int f0/0
    ip add 192.168.101.200 255.255.255.0
    no sh
   int f0/1
    ip add 192.168.102.200 255.255.255.0
    no sh
   int f1/0
    ip add 192.168.120.1 255.255.255.0
    no sh
   !!!! sh ip int brief
   !!!! sh ip route
    Conf t
Router ospf 100
network 192.168.101.0 0.0.0.255 area 0
network 192.168.102.0 0.0.0.255 area 0
network 192.168.120.0 0.0.0.255 area 0
!!!!sh ip protocols
```

```
Cairo Config
=========
en
 conf t
  Hostname Cairo
   int f0/0
    ip add 192.168.120.2 255.255.255.0
    no sh
   int f0/1
    ip add 192.168.121.2 255.255.255.0
    no sh
   int f1/0
    ip add 192.168.122.4 255.255.255.0
    no sh
   !!!! sh ip int brief
   !!!! sh ip route
    Conf t
Router ospf 200
network 192.168.120.0 0.0.0.255 area 0
network 192.168.121.0 0.0.0.255 area 0
network 192.168.122.0 0.0.0.255 area 0
!!!!sh ip protocols
```

Network Design and Planning

Topology Design: Create a detailed network diagram outlining all devices (routers, switches, end devices) and their interconnections.

Device Selection: Choose appropriate devices (routers, switches) based on project requirements and budget.

IP Addressing: Assign IP addresses to devices and subnets in a logical manner.

Routing Protocol Selection: Determine which routing protocol (OSPF or EIGRP) to use in each network area.

Area Division: Divide the network into areas for efficient routing management.

Device Configuration

Basic Configuration: Configure device names, passwords, and interfaces.

OSPF Configuration:

Enable OSPF on required interfaces.

Assign area IDs to each area.

Configure router IDs.

Configure DR and BDR.

EIGRP Configuration:

Enable EIGRP on required interfaces.

Configure autonomous system (AS) number.

Configure metric weights (K values) if needed.

Verification

Neighbor Verification: Ensure routers are forming neighbor relationships correctly.

Routing Table Verification: Verify that routers are learning routes correctly.

Connectivity Testing: Perform connectivity tests between devices to ensure network functionality.

Troubleshooting

Simulated Failures: Simulate various network failures (e.g., cable cuts, interface failures) and observe protocol behavior.

Analysis: Analyze the output of show commands to identify issues.

Troubleshooting: Make necessary configuration changes to resolve issues.

Troubleshooting Commends:

show ip interface brief -1

show ip route -2

show ip ospf database -3

show ip ospf neighbor -4

show ip eigrp neighbors -5

Conclusion

This project successfully demonstrated the configuration and troubleshooting of the OSPF and EIGRP routing protocols. By designing, implementing, and testing a network environment, we were able to gain valuable insights into the operation and behavior of these protocols.

Key achievements of this project include:

Successful Network Implementation: We successfully designed and implemented a network topology that met the project requirements.

Accurate Protocol Configuration: Both OSPF and EIGRP were configured correctly, ensuring proper routing between devices.

Effective Troubleshooting: We were able to identify and resolve various network issues, demonstrating our understanding of the protocols.

Comprehensive Document: Detailed documentation was created, capturing the entire project process, configurations, and results.

Overall, this project has enhanced our understanding of:

Routing principles: The fundamental concepts of routing, including routing tables, routing protocols, and routing algorithms.

OSPF and EIGRP: The specific features, configurations, and troubleshooting techniques for OSPF and EIGRP.

Network troubleshooting: Effective methods for identifying and resolving network issues.

To further enhance our knowledge and skills, we recommend the following:

Advanced Routing Protocols: Explore more advanced routing protocols such as BGP and IS-IS.

Network Automation: Investigate network automation tools to streamline configuration and management tasks.

Security: Focus on network security measures to protect against threats.

Cloud Networking: Explore cloud-based networking technologies and their integration with traditional networks.

In conclusion, this project has provided a strong foundation for understanding and working with OSPF and EIGRP. The knowledge gained from this project will be invaluable in future networking endeavors.

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